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NOTES AND LITERATURE

HEREDITY

The Possibility of Inheritance through the Placental Circulation instead of through the Germ Cells.—In the December issue of The American Naturalist reference was made to Professor Bateson's explanation of the inheritance of hæmophilia. Hæmophilia is a tendency to excessive bleeding, ascribed either to "a peculiar frailty of the blood vessels or some peculiarity in the constitution of the blood." It is seen far more often in males than in females, yet the males do not transmit it. Physicians are so confident of this as to recommend that "the daughters should not marry as through them the tendency is propagated."

Professor Bateson compared the inheritance of hæmophilia with that of the horned condition in sheep. A hornless breed crossed with a horned form yields horned males and hornless females. The latter will transmit horns to their male offspring only, unless again crossed with horned stock, when horned females will also appear. This analogy with hæmophilia holds good in so far as the females transmit a condition which they do not present, and it suggests a possible explanation of the occasional manifestation of hæmophilia in females. It fails, however, in an essential point. The horned male sheep transmit their condition whereas the hæmophilic males do not.

A different explanation is suggested by the studies on immunity reviewed and supplemented by Dr. Theobald Smith.[1] Ehrlich, as he states, found that female mice which had been made immune to certain toxic substances gave birth to young which were also somewhat immune. The immunity was soon lost and was never transmitted to the second generation. Immune males did not transmit any immunity to their offspring. Other investigators, using rabbits and guinea-pigs, have shown the transmission of several forms of immunity through the females only.

The artificial immunity may perhaps be permanent in the parent guinea-pigs. It has lasted long enough to affect four litters of one female, and Smith has records of "a considerable number of guinea-pigs which transmitted immunity for over a year.'' One animal gave birth to a litter of immune young thirty months after receiving the immunizing injection. The immunity is not so well marked in the offspring, and Smith agrees with the general conclusion that the grandchildren of immunized females are never affected.

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[1] Smith, T. The degree and duration of passive immunity to diphtheria toxin transmitted by immunized female guinea-pigs to their immediate offspring. *Jour. of Med. Research,* 1907, vol. 16, pp. 359–379.

Ehrlich found that in mice lactation plays an important part in the transmission of immunity to offspring, and that normal offspring may gain a considerable degree of immunity by being nursed by immune mothers. This conclusion requires confirmation, for Vaillard and Remlinger agree that, in guinea-pigs and rabbits, nursing from an immune mother does not confer immunity.[2] Rosenau and Anderson[3] were able to exclude the milk as a factor in transmitting hypersusceptibility to serum injections by a series of ''exchange experiments.'' In these experiments the offspring of a susceptible mother are given, immediately after birth, to a non-susceptible guinea-pig to nurse, and the young of the non-susceptible guinea-pig are placed with the susceptible mother. ''From these exchange experiments we learn that the hypersusceptibility is not transmitted to the young in the milk.''

Gay and Southard[4] believe that the well-known susceptibility of guinea-pigs to a second dose of horse serum is due to an unisolated substance which they name *anaphylactin.* This is probably transmitted from the blood of the mother to that of her young through the placental circulation. It is contained in the serum of a guinea-pig two hundred and four days after the animal has been made susceptible by the first injection, and if from 1.5 to 2.5 c.c. of serum from such an animal are transferred to a normal guinea-pig, the latter becomes susceptible. However, a transfer of serum from the second guinea-pig to a third does not produce susceptibility and this result corresponds with the observation that artificial immunity is inherited only by the first generation.

It is possible that hæmophilia is due to an abnormal chemical composition of the blood, such as produces its manifestations in the male rather than the female, owing to differences in metabolism in the two sexes. If its cause is a substance in the blood it may be "inherited" from the female alone, and the male which manifests the disease can not transmit it. Thus it would be a case of transmission through somatic elements rather than through the germ cells.

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[2] Cited by Smith, *loc. cit.*

[3] Rosenau, J., and Anderson, J. F. Further studies upon hypersusceptibility and immunity. *Journ. of Med. Research,* 1907, vol. 16, pp. 381–418.

[4] Gay, F. P., and Southard, E. E. On serum anaphylaxis in the guinea-pig. *Journ. of Med. Research,* 1907, vol. 16, pp. 143–180.

F. T. L.

INVERTEBRATE MORPHOLOGY

Form Variation in Amblystoma tigrinum.—Powers[1] has observed the aquatic forms of this salamander both in their natural environment and under artificial conditions. His paper contains a large amount of material of great interest which would be much clearer reading if the numerous observations and experiments had been more explicitly described as to objective point and methods employed. The paper is too long for condensation here, but a few of the results can be noticed and will be welcome to those interested in the axolotl question. He distinguishes two main types, the ordinary larvæ and the cannibals, both by habits and in important points of structure. Taking the ordinary form first, two types as a body form are recognizable: those with the habit of crawling about on the bottom in a sluggish manner and thus living largely in the dark, these are of a broader shorter form and are called the "robust type," and a second type of quite different habit, being active swimmers going about actively in search of their prey, and of an elongate slender form, the "slender type." There is a great difference in the ratio of head width to total length in these two types, head width being contained 6.42 in total length in the robust type and 11 times in the slender ones. The mode of feeding is quite different in these two types. In the robust bottom-living forms food is obtained by using the mouth as a sieve and opening it widely to strain water through it in hopes of finding food thereby, with the result that the gape is increased. On the other hand, the slender swimming forms go about actively in search of prey, which, when they see it, they actively seize so that the mouth is not opened so widely as in the sieving process of the sluggish robust type. He also notes variations in special parts, such as the tail, the head and the posterior limb. Tails vary

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[1] Powers, J. H., '07. Morphological Variations and its causes in *Amblystoma tigrinum.* Studies from the Zoological Laboratory of the University of Nebraska, 71, pp. 1–77, pls. i–ix.